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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 19

Application Number: 08/869,589
Filing Date: June 5 1997
Appellant(s): Strolle

Raymond R. Moser
For Appellant

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 12/4/2000.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1, 9, 10, 12, 15 and 16 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

5,793,821	Norrell et al.	11 August 1998

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

I. Claims 1, 9, 10, 12, 15 and 16 are rejected under 35 U.S.C. 102(e).

The rejections are hereby reproduced for convenience.

I. Claims 1, 9, 10, 12, 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Norrell et al (US 5,793,821).

Regarding claims 1 and 12, Norrell et al (Norrell) disclose an apparatus for equalizing the amplitudes of a signal (column 7 line 65 to column 8 line 2) comprising:

a timing interpolation filter (figure 5 item 504) for providing samples for the upper and lower bandedge filters (column 8 lines 7-14) and a delay line (figure 5 item 506) which is part of the modem receiver's adaptive equalizer (column 9 lines 34-35) where the delay line is long enough to compensate for the amplitude and delay distortion in general, it is long enough to compensate for the differential delay distortion at a particular pair of frequencies (column 9 lines 43-48);

upper and lower bandedge filters (figure 5 items 508 and 512) which extracts the bandedge signal; and

a signal processor (figure 5 item 518-530 and column 8 lines 50-67) which provides a control signal to the filters to remove noise and interference to compensate for the amplitude distortions.

Regarding claim 9, 10, 15 and 16, Norrell further discloses an apparatus and method for equalizing the amplitudes of the bandedges of a broadband signal as stated above in paragraph 4. Through the course of compensating for the effects of amplitude distortion, the bandedge signals must be attenuated and amplified.

(11) Response to Argument

A. Introduction

Prior to responding to the arguments, the examiner would like to describe the field of the invention which is the same for the application and the Norrell reference.

In electronic communication systems, a transmitter transmits a signal to a receiver over a transmission medium. Examples of this transmission medium are a telephone cable or a wireless transmission path. These media will introduce noise or some type of distortion into the received signal which cause errors to occur in the decoding process after the transmitted signal

has been at a receiver. These error can cause the receiver to be unable to create an exact duplicate of the transmitted signal. This effect is undesirable.

In the transmitter, bits are encoded into symbols for transmission. The encoding process is performed at a symbol rate. The exact symbol rate of a transmitter is usually under control of a local time reference. While it is possible to transmit this timing information explicitly, it is usually undesirable to invest the signaling bandwidth or increase signal power for this purpose. Therefore, the discrete amplitude and phase changes imposed on the carrier wave are used to convey two things to the receiver: the data sequence of symbols, and the timing information necessary to decode this sequence at the receiver.

A common mode for recovering the timing from a waveform is called Envelope Derived Timing which is based on the phenomena that periodic changes in phase and amplitude in a carrier waveform cause changes in the carrier's power envelope. A receiver utilizing this timing recovery method can reconstruct the symbol rate from the variations in the power envelope detected by the receiver. Typically, a receiver reconstructs the timing envelope from energy near the upper and lower bandedges of the signal.

B. Description of the Norrell reference

Norrell points out the timing envelope is the most robust, and therefore the best for recovering timing information, when energy from the upper and lower sidebands arrives at the

timing envelope detector simultaneously. Norrell discloses compensating for delay distortion at the upper and lower bandedges and also advantageously compensating for the effects of amplitude distortion on the communications channel. By eliminating the delay distortions in the receiver sample delay line, Norrell allows the upper and lower sidebands to be received simultaneously.

C. Response to arguments

The examiner discusses the claims in the same order as the applicant.

I. Claims 1, 9, 10, 12, 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Norrell et al (US 5,793,821).

For clarification the instant application elements have been matched with the equivalent Norrell elements below:

instant application element	Norrell element
pre-equalizer	Timing interpolation filter (fig.5 item 504) and Receiver equalizer (fig. 5 item 506)
bandedge filter	Bandedge filters (figure 5 items 508 and 512)
bandedge signal processor	elements 518-530 shown on figure 5

control signal	signal from coefficient computation unit 530 on fig. 5 to the timing interpolation filter item 504

Claim 1- Applicant states the timing interpolating filter and the receiver equalizer sample delay line does not teach or suggest the applicant's "pre-equalizer for adjusting the amplitudes of the bandedges of a broadband signal." Applicant further states these elements merely compensate for differential delay distortion between the upper and lower bandedges. Norrell discloses the equalizer delay line is of finite length, but long enough for the desired compensation to allow the proper amount of delay distortion compensation to take place to allow the bandedges to be received simultaneously which is the main objected of the invention. This is disclosed in column 9, lines 34-44. Norrell further discloses in this paragraph, "this is because, if the delay line is long enough to compensate for amplitude and delay distortion in general, it is long enough to compensate for the differential delay distortion at a particular pair of frequencies" (Column 9, lines 44-48). To compensate for the amplitude distortion, the amplitude must be adjusted in some way to combat the distortion. If the entire signal is compensated for amplitude distortion, the bandedges of the signal will be compensated for amplitude distortion since the bandedges are a component of the original signal. This statement, at least, suggests amplitude distortion compensation takes place in the delay line. The upper and lower bandedge filters then will pass the desired bandedge signals to extract the timing information from the signal.

Applicant points out the examiner had explicitly conceded in paragraph 2 of the final office action that adjusting the amplitude of bandedges "is not used in" Norrell. Some clarification is necessary. Norrell discusses this step of amplitude equalizing of the channel prior to extracting of the timing envelope but decides on the filtering technique instead as stated in column 9, lines 1-15. Norrell does not explicitly state the amplitude adjustment of the bandedges takes place in the system. However with the statement found in column 9, lines 44-48, Norrell at least suggests amplitude distortion compensation is capable of taking place in the equalizer delay line

Applicant additional disagrees with the examiners contention that Norrell clearly suggests a step of equalizing for adjusting the amplitude of the bandedges, specifically citing column 9, lines 11-15 which states: "this filtering technique is superior to simple amplitude equalization because equalization boosts the desired energy at the bandedges, but also boost the unwanted energy near the bandedges." Applicant states the cited section is directed to channel equalization and not the specific adjustment of bandedges of a broadband signal in response to a control signal since channel equalization generally involves equalization of the entire frequency response and, as such is not the same as adjusting bandedges. However, if the "amplitude equalization of the channel" (column 9, line 12) adjust the amplitude of the entire signal, the bandedges, which are a component of the signal, will also be amplitude adjusted. The following statements are found in the advisory action (paper #16) used to describe the

control signal generated from the "bandedge signal processor". The "bandedge signal processor" is defined above.

Item 530 in figure 5, provides coefficients to the interpolation filter 504 which changes the delay characteristics in the interpolation filter. This "control signal" is fed from the coefficient computation unit to the interpolation filter.

The adjusting of the amplitude of the bandedges in response to the control signal is indirectly done. By sending the coefficients to the timing interpolation filter from the coefficient calculation unit, the delay values in the lower and upper bandedges are altered. By adjusting this delay value, the amplitude distortion of the signals (including roll-off values) are compensated for. This compensation is equal to adjusting.

Claim 9- Applicant states the reference does not disclose the specific adjustment of attenuating a particular bandedge. However, though the course of amplitude adjusting the signal, a particular bandedge can be reduce to a zero value thereby attenuating the bandedge.

Claim 10- Applicant states the reference does not disclose the specific adjustment of amplifying a particular bandedge. However, though the course of amplitude adjusting the signal, a particular bandedge can be increased to compensate for distortion to a amplitude higher than it's original amplitude thereby amplifying the bandedge.

Claim 12- Applicant states claim 12 is a method claim reciting similar limitations as those found in independent apparatus claim 1. Please see the discussion of claim 1 stated above regarding the rejection of claim 12.

Claim 15- Applicant states the reference does not disclose the specific adjustment of attenuating a particular bandedge. However, though the course of amplitude adjusting the signal, a particular bandedge can be reduce to a zero value thereby attenuating the bandedge.

Claim 16- Applicant states the reference does not disclose the specific adjustment of amplifying a particular bandedge. However, though the course of amplitude adjusting the signal, a particular bandedge can be increased to compensate for distortion to a amplitude higher than it's original amplitude thereby amplifying the bandedge.

(12) Conclusion

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Kevin M Burd

Kevin M. Burd
February 20, 2001

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